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A Unified Analysis of P-stranding, ECM, and *That*-deletion, and the Subsequent Loss of Verb Movement in English

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1. Introduction

In this paper I account for a number of facts from the history of English. In the end, the analysis provides an explanation for the spread of periphrastic *do* and the loss of verb movement.[1]

The historical facts, stately briefly:

(1) preposition stranding, ECM constructions, and the option of deleting the sentential complementizer *that* are all Middle English innovations (see van Kemenade (1987), Lightfoot (1991), and Arnold (1995a), respectively);
(2) the statistically significant use of periphrastic *do* and the first use of indirect object passives (IOPs) occurred at the end of the 14th century, and both remained relatively rare until the end of the 15th century (see Ellegard (1953) on *do*, and Denison (1993) on IOPs);
(3) transitive verbs which had selected Dative complements in Old English (e.g. *help*) start showing novel passive forms (e.g. *The men were helped*) in the 13th century; however, indirect objects (also marked Dative in Old English) did not appear as the subject of passive for 100-150 years after the appearance of the novel direct object passives (see Denison (1993));
(4) from 1400-1700, the relative frequency of periphrastic *do* was higher with transitive verbs than with intransitives; with respect to different sentence types, the relative frequency of *do* was highest with negative questions, then affirmative questions, then negative declaratives and was lowest in affirmative declaratives (see Ellegard (1953));

The chronological parallel between the emergence of preposition stranding, ECM, and *that*-deletion can be explained by proposing a unified analysis for the three construction

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[1] The analysis presented here is an extension of the proposal in Arnold (1995b). Arnold (1995a) provides an extensive discussion of the subtle issues which cannot be adequately addressed in these 15 pages.

types. My proposal is that all three constructions are instances of the LF incorporation of (certain) functional elements into verbs. In turn, the emergence of the incorporation mechanism had consequences for verb movement and ultimately led to the spread of periphrastic *do*.

The proposal is based on the following three hypotheses:

i.) the grammatical status of prepositions was ambiguous in late Old English and early Middle English, i.e. whether prepositions belonged to the class of lexical or functional items was not clearly delineated in the primary linguistic data (PLD);
ii.) the loss of a distinction between Accusative and Dative case in early Middle English meant that there was no longer an overt trigger for a formal distinction between the Case features associated with prepositions versus the Case features of verbs;
iii.) the combined effects of the ambiguities in (i-ii) led to a grammatical reanalysis in which 1.) the formal and semantic features previously associated with verbal prefixes came to be assigned to prepositions, and 2.) the Case checking property of prepositions came to be an optional feature, i.e. prepositions were no longer consistently projected from the lexicon into phrase structure with a Case feature.

I argue that the reanalysis outlined in (iii) led to the emergence of preposition stranding and ECM constructions in Middle English due to the novel affixal and Case properties associated with prepositions. In essence, the reanalysis pushed prepositions into the class of functional elements, along the lines suggested by Miller (1993), thus allowing them to encode grammatical functions not usually associated with lexical heads. Furthermore, by viewing preposition stranding and ECM constructions as structures in which functional elements incorporate into verbs, it is possible to establish a theoretical account for the chronological parallel between the progress of *that*-deletion, the emergence of IOPs, and the spread of periphrastic *do*. The details of my proposal recast the analyses of preposition stranding in Hornstein and Weinberg (1981) and Kayne (1981), as well as Lightfoot's (1991) proposal for *to* coalescence. The idea is that the formation of a complex verbal element, either [V. . . P] for preposition stranding, or [V. . . *to*] for novel infinitival constructions, is an instance of the LF incorporation of a functional element into the verb which governs it.[2]

There are two theoretical issues which arise through the course of the discussion. First, as suggested by Lightfoot (1993), I assume that string adjacent objects can be manipulated by the morphological component and do not require a syntactic operation to create the synthetic form. Lightfoot's discussion focuses on English affix-hopping, but I will assume the idea generally. The issue is important for the analysis of the history of double object constructions and the emergence of indirect object passives. The second theoretical detail relates to the minimalist assumption that the numeration contains fully specified lexical items. Certain facts about the history of *do* cannot be explained given the strict lexicalist view of the numeration; in order to account for the spread of *do* and the loss of verb movement in English, it will become clear that it is necessary to modify the minimalist framework and assume that lexical insertion occurs at Spell-Out.

The paper proceeds as follows. In section 2, I outline the historical factors which led to a reanalysis of the formal features associated with prepositions during early Middle English. Section 3 addresses the chronological parallel between the emergence of preposition stranding, ECM, and *that*-deletion. The parallel between the emergence of indirect object passives and the use of *do* is explained in section 4. Finally, the spread of *do* is explained in section 5, including the patterns discovered by Ellegard (1953).

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[2] See Chomsky (1993) for discussion of this type of movement within a minimalist analysis.

2. Triggering the Reanalysis

As outlined above, the idea is that various changes in the linguistic input (from Old English to early Middle English) created a situation in which the language acquisition device (LAD) could posit a unitary analysis for what had clearly been two different classes of elements in early Old English, e.g. verbal prefixes and prepositions. The discussion in this section outlines the various ways in which the linguistic input provided ambiguous triggers to the LAD with respect to the status and function of prepositions in early Middle English.

First, Hiltunen (1983) shows that the development of phrasal verbs (e.g. *look up*, *run down*) in early Middle English was directly related to the system of verbal prefixes in Old English. In particular, by late Old English, verbal prefixes and prepositions were often used in conjunction with one another to express the thematic relation between a verb and a noun phrase. My proposal is that the simultaneous use of a preposition with a verbal prefix created an input in which the full lexical status of prepositions became obscured by virtue of being simultaneously used with a verbal affix.

Additionally, although the verbal prefixes were morphological affixes, some of them were separable; they could thus occur in the phonetic string in a position separated from the verb. Given separable prefixes, some of the verbal prefixes could appear in the PLD to have the property of being an independent head. At the same time, prepositions were being used more and more frequently in close association with verbal affixes. I have no comments about the shift during Old English from the prefixal to the prepositional system. The relevant point is that even during Old English, it appears that the system of verbal prefixes was becoming an inconsistent aspect of the PLD, and the combined use of prepositions with verbal prefixes was becoming increasingly more common during late Old English.

In addition to the overlapping use and distribution of verbal prefixes and prepositions, the loss of a distinction between Accusative and Dative case added another dimension to the ambiguity of the grammatical status of prepositions. In Old English, prepositions (predominantly) assigned Dative case to their complements, while verbs (predominantly) assigned Accusative. Consequently, there was a clear and direct trigger for the LAD to hypothesize a distinction between the Case features of prepositions versus the Case features of verbs. In other words, the overt morphological case distinctions provided sufficient evidence that prepositions and verbs were associated with distinct Case features. However, with the loss of the overt morphological distinction between Accusative and Dative case, it was no longer definitively clear whether the verb or the preposition was assigning case to a prepositional object in VP. That is to say, given SVO word order in the PLD, the acquisition device could plausibly posit either [V [P+NP]] or [V+P [NP]] as the structure for prepositional objects since there was no overt distinction between the Case assigned by verbs versus the Case assigned by prepositions.[3] Therefore, with the loss of the overt morphological distinction between Accusative and Dative case, one of the direct triggers for the lexical status of prepositions became obscured for those structures in which the preposition was part of a complex verb form.

Given the collapse of the morphological case paradigm and the increasingly common use of prepositions in conjunction with verbal prefixes, I propose that the consequence was the emergence of a unified hypothesis concerning the grammatical status of the verbal prefixes and prepositions:

[3] In fact, alternations like *pull up the rope* and *pull the rope up* would necessarily show that the prepositional component of such phrasal verbs was an a-typical preposition, thus providing a trigger for the [[V+P] NP] analysis for phrasal verbs.

i.) the verbal affixal feature of the Old English verbal prefixes was extended to prepositions generally, thus allowing the emerging grammars to produce [V+P] phrasal verbs (rather than just V+PP structures),
ii.) the strength of the affixal feature changed from strong to weak, thus accommodating the independent head-like property of prepositions, and
iii.) given the possibility that a preposition could be part of a complex [V+P] verb, it also became possible that prepositions could be projected from the lexicon into phrase structure without a Case feature.

The idea is essentially an extension of Miller's (1993) proposal that prepositions are lexical items which (can) have the capacity to exhibit properties characteristic of functional items. The early Middle English period can be characterized as a shift in the grammatical status of prepositions from lexical to functional elements in the sense that it became possible to map prepositions into the computational system with an affixal feature, thus generating an item requiring incorporation into a V head. Furthermore, just as Miller observes that affixation is often historically based on an incorporation process, I propose that the reanalysis of prepositions in early Middle English provides an example of the opposite change, i.e. the system of verbal prefixes in Old English led to a system of preposition incorporation in Middle English.

To close this section, I add two points of clarification. First, the proposals I have made for the status of prepositions applies specifically to those prepositions which are thematically related to verbs, where "thematically related" is meant to refer to the same formal and/or semantic relationship which existed between a verb and a verbal prefix in Old English. The assignment of those features to a preposition is in fact optional, i.e. prepositions which receive those features become an affixal element which must be incorporated into a verb. For the sake of exposition, I will refer to the formal/semantic features which relate a preposition to a verb as an affixal feature, though in fact the substantive claim is that an "affixal preposition" has whatever formal or semantic features associated with an Old English verbal prefix. Second, even though the term "affix" is typically used to refer to bound morphemes, I assume that an "affixal preposition" maintains its word-level status as an independent head in the phonological component; the affixal property of such prepositions generally affects a derivation covertly, i.e. the checking relation which is established to check the affixal feature does not (necessarily) generate a morphologically complex head. The consequences of these affixal prepositions are discussed in the following section.

3. Implications of the Reanalysis

3.1 Preposition Stranding

I suggested above that the innovation of preposition stranding was tied to the novel possibility of 1.) optionally assigning an affixal feature to a preposition, and 2.) optionally not assigning a Case feature to a preposition.[4] I will represent the fact that either the affixal feature or a Case feature has been assigned to a preposition with '+' and '-' symbols, but in fact only the '+' symbol should be seen as having formal content; the '-' symbol is simply an expository device which represents the fact that the particular feature has not been assigned to the preposition in the mapping from the lexicon to the numeration.

[4] This view of the optional assignment of features to lexical objects is based on Chomsky's (1995) assumptions concerning the properties of elements in the numeration, the basic idea being that certain features are inherently associated with a given lexical item, but other features are optionally assigned to a given lexical item as a result of the mapping from the lexicon to the numeration.

Under this view, the analyses of preposition stranding in Hornstein and Weinberg (1981) and Kayne (1981) become restated: a derivation in which a preposition is stranded converges if the affixal preposition (or perhaps just the affixal feature) incorporates at LF into the verb. Additionally, as the previous accounts made use of a reanalysis rule which allowed the trace of the prepositional object to be in a formal licensing relation with the verb (either Case, for Hornstein and Weinberg, or proper government for Kayne), I assume that the LF incorporation of the affixal preposition allows the trace of its complement to be licensed. The precise nature of the licensing relation is not immediately obvious under strict minimalist assumptions, but I will assume that the LF incorporation of an affixal preposition allows a derivation with preposition stranding to converge.[5]

The proposal predicts four types of prepositions which I detail briefly:

i.) [+aff., +Case] -allows preposition stranding from adjuncts, checks Case feature of its complement: *What did John talk to Mary about?*

ii.) [-aff., +Case] -archetypical preposition: checks the Case feature of its complement but is not formally (i.e. not featurally) required to incorporate into a verb: *. . . the book on the table . . .*

iii.) [+aff., -Case] -allows pseudo-passive because the Case feature of the preposition's complement is checked by the verb: *John was laughed at.*

iv.) [-aff., -Case] -cannot license a complement: such a preposition cannot itself check the Case feature of its complement NP, nor can the Case feature of its complement NP be checked by the verb because the preposition does not incorporate into it.

A [+aff.] preposition allows P-stranding, and whether the preposition is projected from the lexicon with a Case feature determines whether the prepositional object can move to SpecAgr S, i.e. a [-Case] preposition allows pseudo-passive because the Case feature of the prepositional object is checked by the verb if the preposition is [-Case].[6] The inability of a [-aff., -Case] preposition to license a complement will become an important factor in explaining the historical parallel between the innovation of indirect object passives and the use of periphrastic *do*.

3.2 ECM and *To* Coalescence

Lightfoot (1991) proposes that English ECM constructions should be characterized as involving a process in which the coalescence of *to* with the matrix verb allows the head-government and Case properties of the matrix verb to be transferred to the embedded subject position. His proposal provides an account for various details of structures with accusative subjects of infinitivals, and he goes on to argue that *to* coalescence developed during Middle English. As stated above, my proposal is to recast Lightfoot's discussion of *to* coalescence in terms of incorporation, essentially invoking the same basic assumptions discussed in the previous section.

The idea is that the infinitival marker *to* in an ECM construction is a [+aff, -Case] preposition-like element which heads the embedded clause and incorporates into the ECM

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[5] The problem with trying to directly translate previous accounts of preposition stranding into a minimalist framework is that while movement of a head extends the minimal domain of the moved item, there is no clear way to "extend backwards", as it were, such that the object of an incorporated preposition comes to be in a domain of a verb which it had not been in previously. Ideally the entire discussion would be presented using strict minimalist assumptions, but certain facts related to infinitival constructions are not easily captured without a notion of proper government (see Arnold (1995a); I set aside these issues here.

[6] See Arnold (1995a) for detailed discussion of restrictions on preposition stranding:
John relied heavily on Mary —> **Mary was relied heavily on* | *Mary was relied on heavily.*

verb. Additionally, when infinitival *to* heads the embedded clause of an ECM construction, it is projected from the lexicon with an additional feature, to be specified, which allows it to function has the complement clause for an ECM verb; the additional feature is checked when the embedded subject moves to matrix SpecAgrO to have its Case checked. Furthermore, I follow Lightfoot and assume that infinitival *to* allows the subject trace of an embedded infinitival to be licensed by virtue of *to* providing a lexical head governor for the subject trace. Finally, unlike prepositions, infinitival *to* is never [+Case]. As for the additional feature which allows *to* to function as the head of the complement clause in ECM constructions, I propose that the additional feature is a D feature for the simple reason that the *to*-infinitival marker is historically related to the preposition *to*, a fact which I discuss in more detail momentarily. The basic idea is as follows. Given that prepositions take nominal complements, it is reasonable to assume that a preposition is generated with a D feature which is checked by the D feature of its complement. With this in mind, the historical development of infinitival *to* from prepositional *to* suggests the possibility that infinitival *to* can receive a D feature in the mapping from the lexicon to the numeration.

The historical evidence that infinitival *to* developed from a preposition is that the inflected infinitivals in Old English could be conjoined with full PPs, as shown by Jarad (1995):[1]

(5) ut eode to his gebede oððe to leornianne mid his geferum
-out went to his prayer or to learn with his comrades
(Bede 162, 7: C: 139)

Given the prepositional status of infinitival *to* in Old English, we would like to know how the development of *to* coalescence during Middle English was related to changes exhibited by the class of prepositions more generally. Within the incorporation approach, *to* coalescence is simply another example of a more general development in the language, namely the optional assignment of an affixal feature to a preposition. Moreover, given the incorporation analysis, it follows straightforwardly that modern ECMs would emerge only if the option of deleting *that* had emerged: if an overt complementizer projects into C^0, then the [aff] feature on *to* would remain unchecked and the derivation would not converge.

In sum, viewing *to* coalescence as another example of the incorporation of a preposition-like element into a verb allows for a natural account of the chronological similarity between the development of preposition stranding and ECM constructions in the history of English. In particular, the analysis is supported by the fact that the *to*-infinitival marker was a preposition in Old English; it is therefore reasonable to assume that the same formal properties which came to be associated with prepositions during Middle English would have also come to be associated with the *to*-infinitival marker. The consequence was the development of two relatively "exceptional" constructions: preposition stranding and ECM.

3.3 Generalizing the Reanalysis: *That* Deletion

In Arnold (1995a) I argue that the possibility of introducing a sentential complement without an overt complementizer, as in (6b), became a productive option during Middle English.

(6) a. I know that John left.
b. I know John left.

[1] Jarad also shows that infinitival *to* in Old English cannot accurately be analyzed as the head of CP, AgrP, or TP. The combined evidence points quite strongly to the conclusion that the *to*-infinitival in Old English was a PP.

For concreteness I use the term "null complementizer" (ø-C) to refer to structures in which it appears that the sentential complementizer has been deleted, as in (6b). In this section I show that 1.) the constraints on the use of ø-C suggest an incorporation analysis, i.e. ø-C can be used in only those structures where it can incorporate into the verb which governs it (though this is modified slightly), and 2.) an incorporation analysis of ø-C provides a straightforward explanation for why the option of using a null complementizer emerged during Middle English, namely, the option of using a null complementizer is another example of the emergence of a grammatical mechanism in which functional elements incorporate into verbs. In particular, I do not assume that ø-C is derived by suppressing the phonological features of *that*; rather, ø-C and *that* are both lexical elements, each with particular formal properties which constrain their use. Based on (7-11), I list in (12) the relevant formal properties of ø-C.

(7) a. John knows $_{CP}$[what$_i$ [ø-C] $_{IP}$[Bill bought t$_i$
b. *John knows $_{CP}$[what$_i$ [that] $_{IP}$[Bill bought t$_i$

(8) a. John knew since this morning that Bill stole the car.
b. ?John knew since this morning Bill stole the car.

(9) a. John believed with all his heart that Bill didn't steal the car.
b. *John believed with all his heart Bill didn't steal the car.

(10) a. That John left yesterday bothered Bill.
b. * John left yesterday bothered Bill.

(11) a. ?John knew since this morning Bill stole the car.
b. John knew since this morning who stole the car.

(12) Properties of ø-C:

i.) ø-C can enter into a checking relation with an element in its Spec, as in (7a);
ii.) if ø-C does not enter into a checking relation with an element in its Spec, it must incorporate into the verb which selects it, though the possibility for incorporation is blocked if ø-C is not properly governed by a verb, as in (8-10);
iii.) if ø-C enters into a checking relation with an element in its Spec, it is licensed in C^0, i.e. it does not need to incorporate in order to be licensed, as shown by (11b) where the strict locality condition for ø-C incorporation is not met, but the structure is nonetheless well-formed; and
iv.) when ø-C is licensed in C^0, it is a proper governor for an embedded subject trace, as would be the case in (11b).

Finally, as is usually assumed for *that*-trace effects, I assume that *that* does not enter into any checking relations with items in its Spec, nor is *that* a proper governor for the embedded subject trace.

Aside from the technical details of the proposal, the core issue is the relationship between overt verb movement and the possibility of using ø-C. In short, the problem is that if the verb moves overtly out of VP, then the constraint against incorporating into traces (Chomsky (1995)) poses a problem for ø-C. On the other hand, given a grammar-internal option for not raising the verb to I^0 (as will be discussed below for the analysis of indirect object passives), then the possibility for the productive use of a null complementizer emerges. In particular, under the assumption that the productive use of the null complementizer is contingent upon the lack of overt verb movement, it is a striking fact that the "deletion" of *that* in embedded subject extraction structures became obligatory in the

same period in which the use of periphrastic *do* increased dramatically and in which the productive use of verb movement was lost.[8]

In general terms, my analysis takes a fairly standard view of the issues surrounding *that* deletion, but the idea made explicit by the proposal is that the distribution of *that* versus ø-C is tied directly to a complementarity of the formal properties associated with each element. In particular, overt *that* has phonological features and whatever formal features are minimally necessary to mark sentential complementation, but it does not have any features which check another element's features in its Spec, nor is it a proper governor. On the other hand, while ø-C has no phonological features, it can license movement of an element to its Spec, and it can serve as a proper governor. More importantly, irrespective of the exact characterization of ø-C, I reiterate the significance of the constraint that ø-C incorporate into a verb if it is otherwise unlicensed: if incorporation into traces is not possible, then we expect that there should be a correlation between the history of overt verb movement and the possibility of using ø-C. Furthermore, given an analysis which unifies *that* deletion, ECM constructions, and preposition stranding as instances of a general process of the incorporation of functional elements into verbs, we have an account for 1.) the historical parallels between the innovations of the novel constructions, and 2.) why the increased use of the novel constructions corresponds chronologically with the decreased use of verb movement.

4. Indirect Object Passives and Periphrastic *Do*

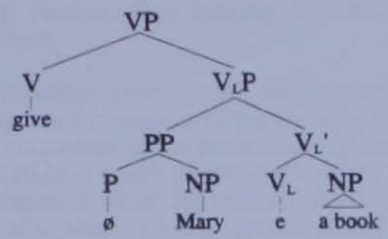
In order to show how the incorporation analysis provides an explanation for the delayed innovation of indirect object passives (IOPs), it will first be necessary to consider the history of double object constructions (DOCs), e.g. *give Mary a book*. In fact, the productivity during Middle English of sentences like *John gave to Mary a book* (hereafter *to*DOCs) poses problems for the analyses in Larson (1988) and Aoun and Li (1989). In short, the presence of *to* in . . . *give to Mary a book* is unexplainable if the presence or absence of *to* is to be derived from the passivization of the lower V projection as it is in both Larson (1988) and Aoun and Li (1989); see Arnold (1995a) for detailed discussion. Given the diachronic facts, I suggest certain revisions to the analysis of DOCs, revisions which in turn allow for an account of the parallel between the use of periphrastic *do* and the emergence of IOPs. The crucial detail of the analysis will be to explain how the preposition in . . . *give to Mary a book* could be projected from the lexicon without a Case feature. In short, the idea is that *do* provided an alternative to overt verb movement, thus allowing *to* to remain adjacent to *give*, and thus allowing the morphological component to treat [give to] on par with other complex [V+P] structures. But for the moment, let us consider the history of double object constructions.

4.1 Revised Structure of Double Object Constructions

First I present the synchronic account, returning to the productivity of *to*DOCs in order to provide a transition to the discussion of IOPs. I assume the structure in (13), where V_L is taken to be a light verb heading a small clause, and where the indirect object of *give* is assumed to be the object of a preposition:

[8] Bergh and Seppanen (1992) show that the first period exhibiting 100% *that*-deletion for embedded subject extraction structures was 1500-1570, essentially the same period which marks the widespread use of periphrastic *do*, as well as overlapping the period which Kroch (1989) takes to be the last period in which verb movement was a productive mechanism, i.e. 1550-1575. See Arnold (1995a,b) for detailed discussion.

(13) . . . give Mary a book



Additionally, I assume that 1.) the null P in (13) does not check the Case feature of its complement, and 2.) since the null P does not enter into a checking relation, it must incorporate into *give* in order for its semantic features to become accessible for the interpretive component. The difference between the null P and the phonologically empty light verb in (13) is that the light verb checks the Case features of its complement, and is thus licensed by virtue of the fact that it enters into a checking relation during the derivation.

In order to account for why the P in (13) must be null for Modern English, I propose the following principle of economy of lexical insertion:

Economy of Lexical Insertion (ELI):

> All other things being equal, the derivation which requires the insertion of fewest words is the most economical.

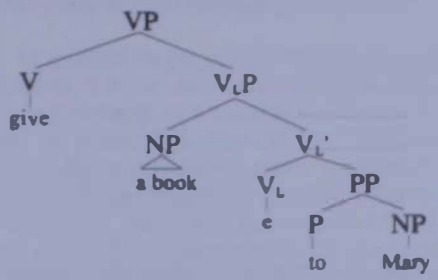
As with all economy principles, ELI is constrained to be evaluated for only those structures which are derived from the same numeration. In other words, it is not the case that ELI is a global principle which would more highly value the derivation of *the red book* over *the book which is red* simply because the first has fewer words than the second. The initial numerations which feed the derivations of *the red book* and *the book which is red* are distinct, and so ELI is not an issue.

For the double object construction represented in (13), my claim is that since the P must incorporate to the matrix V in order for the indirect object's Case to be checked, then the structure for *give to Mary a book* and *give Mary a book* are identical at LF in that they both contain the chain (P_i, t_i); however, the derivations are distinct in terms of the number of overt lexical items that have been inserted into the phrase marker, and so ELI blocks the use of the overt P in (13).[9]

Before turning to the historical development of IOPs, let us first consider a structure in which the direct object precedes the indirect object.

[9] In Arnold (1995b) I show how ELI explains the cross-linguistic tendency for synthetic forms to block periphrastic forms, as discussed by Poser (1992).

(14) . . . give a book to Mary



In keeping with the assumptions thus far, *to* in (14) will incorporate into V_L, thus allowing the Case feature of *students* to be checked by V_L. However, the P must be overt in (14) for the following reason. If the null P is used in (14), then the incorporation process creates a structure in which a null element is incorporated into another null element, and since *give a book Mary* is not an available linguistic structure in Modern English, I propose that phrasal heads with multiple null elements should be ruled out in principle, on par with Pesetsky's (1995) proposal that a morpho-syntactically complex head is not licit if the morpho-phonological realization of that head involves more than one null (or "zero") morpheme.

4.2 Indirect Object Passives

There are two details about the history of IOPs which require attention. First, single object verbs which selected Dative objects in Old English began showing novel passive forms soon after the distinction between Dative and Accusative case had been lost; however, even though single object verbs showed new passive forms by the mid-13th century, passive sentences in which the indirect object occurs as the Nominative subject were not clearly attested until the end of the 14th century (Denison (1993: 110)). The question which arises is why should it have been the case that indirect objects apparently continued to be abstractly Case marked in such a manner that they could not become Nominative subjects even though other previously Dative objects were able to become Nominative subjects. In other words, if the morphological trigger for an abstract distinction between Accusative and Dative objects had been lost, then why couldn't indirect objects become Nominative subjects at the same period that other previously Dative objects could? The second detail which requires attention is the fact that IOPs first appear at essentially the same point in history when *do* is first used in prose. This fact leads to the following question: why should have the change in the abstract representation which allowed for the emergence of IOPs corresponded chronologically with the use of periphrastic *do*? The analysis of DOCs outlined above provides the means to address both issues.

There are two core components to the analysis: 1.) the indirect object is always the object of a preposition (though sometimes the preposition is phonologically null), and 2.) the fact that the null P (ø-P) must incorporate in order to be licensed is distinct from the fact that a preposition with an affixal feature must incorporate. In other words, even though ø-P and $P_{[aff]}$ are similar in the sense that they are both subject to incorporation into a verbal head, they are nevertheless formally distinct: ø-P is morpho-phonologically constrained to incorporate into an overt V head, while $P_{[aff]}$ is an affixal element due to its formal (or semantic) features. The implication is that ø-P cannot be projected from the lexicon without a Case feature because it would then be [-aff, -Case]. As noted in 3.1, such a preposition would not be able to license a complement, and would therefore not be able to occur as the prepositional head of the indirect object PP. The only way for the indirect object's

preposition to be projected from the lexicon without a Case feature would be if it received the [aff] feature, thus making it [+aff, -Case] and consequently able to license a complement.

However, being [+aff] and projecting into the phrase marker as the Specifier of a verb requires a reanalysis of the property initially associated with the [aff] feature. Recall that the emergence of the generalized option to map the [aff] feature to prepositions was the result of PLD in which the preposition was an element in the complement domain of a verb. The situation in which the indirect object projects as the Spec of the light verb is thus not readily alignable with the type of [V+P] structure which was the input for the initial reanalysis which led to affixal prepositions. Given this, the ability for ø-P to be able to be projected with the affixal feature required a further reanalysis of the property associated with [+aff]. In particular, the reanalysis would have to be that [+aff] could be assigned generally rather than being limited to those prepositions which project into the phrase marker as the complement of a verb. I will not develop an account of the exact data which would have driven such a reanalysis, but to the extent that the various innovations discussed in section 3 are all instances of the incorporation of functional elements, then the combined effects of preposition stranding, ECMs, and *that*-deletion in the PLD would have created a strong impetus for the acquisition device to take a very general view about assigning [aff] to functional items.

Notice, however, that preposition stranding (including pseudo-passives), ECM constructions, and *that* deletion have in common that the relevant functional head is the complement of the verb it incorporates into. For this reason it is not necessarily a direct implication that emerging grammars would adopt an overarching generalization concerning the optionality of the [aff] feature with respect to the situation in which the indirect object is merged into the phrase marker as the Spec of the light verb. The one additional factor which would allow the generalization concerning [aff] to be extended to the indirect object's preposition would be if there was a grammar-internal option for not moving the verb out of the VP, where a "grammar-internal option for not moving the verb" is not simply a random matter of whether a given derivation involves an auxiliary. Rather, it has to be the case that the grammar has access to a device which would allow a derivation to proceed such that the indirect object's preposition remains adjacent to *give*, thus allowing the morphological component to manipulate the two adjacent objects and generate a derivation in which the [aff] feature on *to* is checked. Indeed, a grammar-internal option for not moving the verb emerges when the semantically vacuous, periphrastic element *do* can be used in place of V-to-I raising.

This is not to say that verb movement would have no longer been an option, only that within the grammar there existed a device for projecting lexical material into the functional projection of Inflection without moving the verb to I^0. The crucial point is that once *do* was adopted as a periphrastic device, the indirect object's preposition could receive the [aff] feature because there was a mechanism within the system to allow the verb to remain in VP. Given that, the option for the indirect object's preposition to be Caseless emerged, i.e. once *to* could be [+aff], it could then be projected into the numeration without a Case feature. In turn, if the indirect object's preposition is [-Case], and if the matrix verb is passivized, then the indirect object will have to move to SpecIP to have its Case checked. The analysis correctly predicts the chronological correlation between the emergence of IOPs and the use of periphrastic *do* in prose.[10] It also provides an account for the delayed emergence of IOPs: under the assumption that indirect objects are always the object of a

[10] Ellegard (1953) shows that the earliest use of *do* was in verse; arguably *do* would not have been a core component of grammars at that time. However, the periphrastic use of *do* by poets would have introduced the device to the language community, at which point the periphrastic use became a part of the PLD, and ultimately could be reanalyzed by the language learners.

preposition, the possibility of moving an indirect object to subject position required a more substantial change in the system than simply the loss of Dative case. In other words, even though the loss of an overt Dative case marker would have had consequences for the objects of single object verbs, the loss of Dative case was not itself a direct trigger for a change in the manner with which an indirect object's Case was checked. The additional development which allowed for the innovation IOPs was the reanalysis which allowed an indirect object's P to be projected without a Case feature, a reanalysis which hinged on the availability of periphrastic *do*. The next section shows how the incorporation analysis accounts for the spread of periphrastic *do*, including the various patterns found by Ellegard (1953) concerning the frequency of *do* in different contexts.

5. The Spread of Periphrastic *Do*

Notice that if the proposal for a principle of Economy of Lexical Insertion (ELI) is right, then the question of why *do* spread is truly non-trivial: given that the use of a periphrastic form is the dispreferred option, it must have been the case that there was an additional factor within the grammars of Middle English speakers which ultimately favored the use of *do*. The nature of the problem becomes very clear in light of Evers and van Kampen's (1994) observation that Dutch children overgeneralize the use of *doen* only to later restrict its use in the adult fashion. This fact about the acquisition of Dutch leads to the following question about children acquiring Middle English: why did English children in the 15th and 16th centuries not abandon a generalized use of *do* and acquire verb movement the way modern Dutch children abandon their overgeneralized use of *doen*?

Furthermore, given the patterns found by Ellegard, it seems unlikely that the spread of *do* was simply an accident of sociological convention. In other words, it is not clear what sociological pressure would have generated the pattern in which *do* was used more frequently with transitive verbs than with intransitives. Likewise, the fact that the relative frequency of *do* was highest in negative questions, then affirmative questions, then negative declaratives, and was lowest in affirmative declaratives, is also highly suggestive of a grammatical factor influencing the use of *do*. In order to see how the incorporation analysis proposed here accounts for these facts, it is necessary to briefly discuss the minimalist assumptions concerning Spell-Out and lexical insertion.

In short, given the minimalist assumption that the numeration contains fully specified lexical items, the competition between verb movement and *do* could not have been resolved by any grammatical considerations (either in the adult grammar or due to the acquisition process) for the simple reason that derivations based on distinct numerations are not comparable by the computational system: if the numeration for the derivation of a Middle English sentence did not contain *do*, then overt verb movement would have occurred; if the numeration contained *do*, then verb movement would not have occurred. Given a fully specified lexical numeration, there is no way to provide an account for the spread of *do* which is based on grammatical considerations. Moreover, it is entirely unclear why the numeration leading to a negative question would have been more likely to contain *do* than any other type of sentence, while the numeration for an affirmative declarative would have been least likely to contain *do*.

The alternative is to adopt a model in which Spell-Out is lexical insertion. Under this view, the numeration contains purely abstract elements which feed the computational system, and specific lexical items are inserted as a function of Spell-Out.[11] Given lexical insertion at Spell-Out, it is possible to compare the relative economy of a derivation with *do*

[11] Notice that one of the motivations for moving from the set-theoretically simple "array" to the more complex "numeration" disappears: the question of whether the derivation of *Mary saw John* is compared to the derivation of *John saw Mary* becomes moot if lexical insertion occurs at Spell-Out.

to a derivation with verb movement. As noted above, ELI would, in the simple case, prefer the derivation with fewer words, and so the derivation with *do* would be blocked. However, given 1.) the influence of the incorporation mechanism which licenses preposition stranding, ECM, and *that*-deletion, and 2.) a constraint against incorporation into traces, the derivation with verb movement would require longer movement (than the derivation with *do*) in order to check the affixal feature on the pertinent functional head:

(15) a. neg. Q with V-to-I-to-C: $P_{[aff]}$ crosses three categories for incorporation into V

$[_{CP}\ [V_i+I]_j\ [_{IP}\ t_j\ [_{NegP}\ [_{VP}\ t_i\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]]]$

b. neg. Q with *do*: $P_{[aff]}$ crosses no categories for incorporation into V

$[_{CP}\ do_j\ [_{IP}\ t_j\ [_{NegP}\ [_{VP}\ V\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]]]$

Given that the derivation with *do* requires shorter movement in order to converge, it blocks the derivation with verb movement. Under this analysis, we can understand why *do* spread through the language, and in fact we have an explanation for the patterns found by Ellegard. First, since a transitive verb is more likely than an intransitive to have a complement containing an element which will incorporate into it, *do* was used more frequently with transitives than with intransitives; second, the distinctions in the relative frequency of *do* in different sentence types follow from the overall degree of complexity in the different structures: ((16a-d) represent the structures from which $P_{[aff]}$ will incorporate into V.)

(16) a. Neg. Q: two instances of form chain, three categories crossed for incorporation

$[_{CP}\ [V_i+I]_j\ [_{IP}\ t_j\ [_{NegP}\ [_{VP}\ t_i\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]]]$

b. Aff. Q: two instances of form chain, two categories crossed for incorporation

$[_{CP}\ [V_i+I]_j\ [_{IP}\ t_j\ [_{VP}\ t_i\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]]$

c. Neg. Decl.: one instance of form chain, two categories crossed for incorporation

$[_{IP}\ V_i\ [_{NegP}\ [_{VP}\ t_i\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]]$

d. Aff. Decl.: one instance of form chain, one category crossed for incorporation

$[_{IP}\ V_i\ [_{VP}\ t_i\ [_{PP}\ P_{[aff]}\ [_{NP}\ ]]]]$

At this point there is one issue I should discuss further. I am not claiming that the derivation of one instance of one type of sentence is compared to the derivation of another type of sentence. Rather, the idea I am pursuing is an attempt to discuss how grammatical considerations can have an affect on the progress of language change, for although it is certain that many examples of change are propelled by sociological factors, the type of patterns exhibited by *do* provides an opportunity to explore the influence that the mechanisms of the grammar might place on the performance system. In other words, given that verb movement and *do* were both grammatical options for English speakers in 1500, it is curious that when they went about the task of writing down sentences, they consistently used *do* most frequently if the sentence was a negative question (and so on). Why should that be?

In order to address the problem, I must push the discussion into an aspect of linguistic theory which is (admittedly) highly speculative, i.e. attempt to offer an account for why a given grammatical form is used in place of another, not for reasons of saliency or felicitousness, but rather due to the influence of the grammar on the accessibility of a given linguistic structure to the other cognitive components—in this case the performance task of writing. In particular, we know that written examples of language are often conservative in terms of providing evidence of changes in progress. Given this, the facts about *do* can be viewed in the following light: assume that 15th and 16th century authors were typical in that their writing tended to be conservative in terms of exhibiting changes in progress. If this was in fact the case, then their tendency would have been to use verb movement rather than *do* provided that the grammatical status of the two competing forms were merely trivially distinct. That is to say, (putting aside the questions of optionality within minimalism) just so long as the grammar provided two legitimate linguistic forms, a writer would tend to be conservative and pick the form that most closely corresponded to previous generations' written forms.

However, for any structure which involved the incorporation mechanism proposed here, a writer's aim of using the conservative form rather than the innovative form would have run headlong into a non-trivial grammatical distinction between the two linguistic forms: a derivation with *do* allowed shorter LF movement than a derivation with V-to-I. Within this scenario, the relative frequency of *do* was highest in negative questions because the derivation of a negative question with verb movement created the highest threshold of ungrammaticality to be overridden be the writer's desire to use the conservative form. In other words, just as anyone who has regularly taught an introductory linguistics course can produce island violations, so an author can presumably override certain aspects of a grammatical system in order to adhere to a particular written form. Nevertheless, with the incorporation mechanism spreading through language, use of the conservative form in a negative question would have created the highest degree of grammatical complexity to be overridden by conscious choice, and thus *do* was used more frequently in negative questions; at the other end of the complexity scale (as outlined in (16) above), the derivation of an affirmative declarative with verb movement created no such grammatical complexity, and so a writer could continue to chose the conservative form with no interference from the grammatical system.

6. Conclusion

Adopting the incorporation analysis for preposition stranding, ECM, and *that*-deletion provides an explanation for why all three options emerged at the same period in the history of English, as well as an explanation for why the use of periphrastic *do* spread through the language. Additionally, the incorporation analysis provides an account for the chronological parallel between the use of *do* and the innovation of indirect object passives. It is interesting that 1.) all of the constructions discussed here are relatively unique to English (if not in absolute terms, then certainly in the degree of productivity), and 2.) all of the constructions emerged and spread during the Middle English period. The analysis proposed here allows us to see that the chronological correspondence between the development of these typological oddities was not simply an accident of history, but that a reanalysis of the features associated with verbal prefixes and prepositions led to preposition stranding, ECM, *that*-deletion, (modern) double object constructions, indirect object passives, the spread of periphrastic *do*, and ultimately the loss of verb movement.

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